

## Cromwell and Comet

By Major James Bingham, *Royal Tank Regiment*





# AFV/Weapons Profiles

***Edited by DUNCAN CROW***

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*Cromwell's war of movement begins: August 15, 1944 and a Cromwell IV finds the turn of speed for which it was designed, racing eastward towards Falaise at the spearhead of the pincer movement which trapped the remnants of 15 German divisions.*  
(Photo: Imperial War Museum)

# Cromwell

by Major James Bingham, Royal Tank Regiment

THE Cromwell tank first went into action in June 1944 in Normandy with the 7th Armoured Division, known from its famous insignia as the "Desert Rats". The Division had fought in all the campaigns in the Western Desert of Egypt since June 1940, from Alamein to the capture of Tunis, and then in Italy up to the River Volturno when it was withdrawn to England. Re-equipped with the new British Cromwell, faster and more powerful than its predecessors in the family line of cruisers, the Division landed in Normandy on D+1. The country through which they had to fight during the next two months, the *bocage*, is not attractive for tank action, being heavily wooded, with many small fields, farms, high-banked hedgerows and narrow roads. It hampered the light, nimble cruisers and favoured the defensive use of the more heavily armoured and powerfully gunned German Tigers and Panthers. It was only after the breakout from the bridgehead, which the German armour had tried desperately to prevent, that the Cromwell came into its own, in the rôle for which it had been designed.

The History of the Royal Tank Regiment illustrates the rôle of the Cromwell in these operations:

"It was on September 2, when the other armoured divisions made only a limited advance,

that the 7th Armoured Division made its deepest thrust—with 1st R.T.R. led by Pat Hobart as its spearhead. Starting at dawn 60 miles behind the line already reached by the 11th and Guards Armoured Divisions, at midnight that spearhead was further north than either of them had gone by that time. It had advanced over 70 miles, despite more resistance and threat of interference than they had met—as it was travelling closer to the back of the German Fifteenth Army in the Pas de Calais sector. The 'Desert Rats', now free from the cramping conditions of Normandy, were recovering the form that had made them famous." (Captain B. H. Liddell-Hart, Vol. II, *The Tanks*, Cassell, 1959, pp. 404-5).

## DEVELOPMENT HISTORY

The Cromwell belonged to the family of cruiser tanks which had been developed from the General Staff policy of the 1930's that stated a need for two quite different types of tank. One was the "infantry" tank, slow and heavily armoured, designed to support infantry against strongly held positions. The other was the "cruiser", lightly armoured and mobile,



which was seen in the traditional cavalry rôle of exploiting a breakthrough. This basic philosophy persisted in Britain for most of the war and, even though the so-called infantry tank had sometimes to be used in the rôle considered appropriate to the cruiser, it governed the development of separate types until a reliable general purpose tank, the Centurion (the A.41), could be produced with adequate gun and armour. Experience against the Germans in 1940 produced demands for a tank gun bigger than the 2-pdr. (40 mm.) then in use but policy on the cruiser still stressed the importance of speed over armour and armament until November 1940 when the War Office stated their need for more heavily armed tanks. In January 1941 designs were sought for a cruiser with front armour 75/65 mm., weight 24 tons, mounting a 6-pdr. (57 mm.) gun on a 60-inch turret ring. This was a significant advance upon the cruisers of pre-war design then in production, the Cruiser Mk. V Covenanter (A.13 Mk. III) and Cruiser Mk. VI Crusader (A.15), but a full year was to pass before prototypes of the new design were to appear. In that period of 1940-41, quantity in production was all important.

Three designs emerged from the 1941 specification for a heavier cruiser and were to go into service:

**A.24 Cruiser Mk. VII Cavalier.** Nuffield Mechanization and Aero were initially approached by the Ministry of Supply and a design was produced incorporating the Liberty engine and other components of the Crusader. Six pilot models were ordered and the first appeared in January 1942 although a production order for 500 had already been placed in June 1941. This was one of the last "off-the-drawing-board" orders to be placed as a short cut to production before thorough testing of pilots.

**A.27 Cruiser Mk. VIII.** Leyland Motors were later asked to accept parentage of a design similar to the A.24 Cavalier after they had themselves, in collaboration with Rolls-Royce, put forward a suggestion early in 1941 for the Rolls-Royce Merlin aircraft engine to be adapted as a tank engine. This engine, to be called the Meteor, was to be used with the Merritt-Brown gearbox with controlled differential steering which had already been installed in the Churchill (Infantry Tank Mk. IV). However, the Meteor engine could not be made available in sufficient numbers at first and Leyland were asked to develop an alternative design with the Liberty engine, which was the only developed engine of sufficient power available in adequate numbers. These two designs were allotted numbers and



*D+1—A Centaur IV 95-mm. howitzer assault tank of "H" Troop, 2nd Battery, 1 Royal Marine Armoured Support Regiment moves inland from the Normandy beaches.*  
(Photo: Imperial War Museum)



*A troop of Cromwell IVs poised on July 18, 1944 for the opening of General Montgomery's offensive east of the River Orne, Normandy.*  
(Photo: Imperial War Museum)



*The ancestry of the A.27 Centaur and Cromwell cruisers is clearly seen in this A.15 Crusader III 6-pdr. gun tank, N. Africa 1943.*  
(Photo: Imperial War Museum)



*The hybrid: early Centaur and Cromwell tanks were externally indistinguishable as illustrated by this Cromwell III, formerly Cromwell X or Centaur fitted with R-R Meteor engine.*  
(Photo: Imperial War Museum)



names: A.27 (L) Centaur—Liberty engine; A.27 (M) Cromwell—Meteor engine.

Leyland Motors accepted parentage of the Centaur and in 1942 turned their factory over completely to tank production. Design work on Centaur started in November 1941 in conjunction with Morris Engines (engine) and David Brown (transmission). The first pilot model appeared in June 1942 and early production tanks were delivered by the end of the year.

The Centaur was designed to accept the Meteor and when this engine was fitted to a number of these tanks in 1943 they were renamed Cromwell X. Meanwhile, the Birmingham Railway Carriage and Wagon Company had temporarily accepted parentage of the Cromwell in September 1941 and working in conjunction with Rolls-Royce (engine), David Brown (transmission) and Leyland Motors (tracks and sprockets), produced the first pilot model in January 1942 at about the same time as the Cavalier emerged from Nuffield Mechanization.

Cavalier's performance was no better than the pre-war Crusader, using the same unreliable engine, and there was clearly no reserve of power available to enable further progress with the project. Production vehicles were initially used only for training purposes until 1943 when half of them were converted to armoured OPs for artillery regiments. In this guise some were used in North-West Europe in 1944-45 by the artillery regiments of armoured divisions. Some other Cavaliers were converted to armoured recovery vehicles.

The Meteor, however, with 600 b.h.p. offered scope for use in heavier tanks while still retaining a satisfactory power/weight ratio. In fact, the Meteor with the Merritt-Brown gearbox together provided the answers to many problems in the power plant and transmissions of fast or heavier tanks, and the Cromwell became the basic tank upon which to build specialist vehicles and variations in armament or armour. Production of Cromwell started in January 1943.

Up to this point the Cromwell had been designed to mount the 6-pdr. gun. Official policy in 1941-42

required a tank gun which was primarily a good anti-tank weapon and, within its class, the 6-pdr. answered this need. During this period the 6-pdr. tank was the principal demand from production. But experience in the open warfare in North Africa had shown that tanks infrequently fought tanks when effecting a breakthrough; the main targets were anti-tank guns, infantry and other soft targets. This called for a weapon with a better high explosive (HE) shell. The American 75-mm. gun used in the Sherman was a good dual-purpose gun and strong demands were made for a similar weapon in British tanks. This led to a reversal of the General Staff policy with a statement on January 3, 1943 which required the greater proportion of tanks of the medium class to mount a weapon which was effective both with HE and also against enemy armour of the type so far encountered. It was agreed that tanks so armed would be supported by others either mounting high-powered armour piercing (AP) or close support weapons. Work was started at once to develop a 75-mm. gun which used American ammunition and many parts of which were interchangeable with the 6-pdr. It was mounted in Cromwell IV and later marks and also fitted retrospectively into modified 6-pdr. mountings. Tanks with the new 75-mm. gun were issued to troops in October 1943.

## DESCRIPTION

The visible and external differences between the various marks of Centaur and Cromwell were few, apart from the changes in armament and the additional armour plate welded to front plates on Mk. VII and VIII. The layout conformed to standard British design with rear engine and transmission driving rear track sprockets. The crew of five were in three forward compartments. The driver and hull gunner sat in front, separated by a plate with an access hole. The commander, gunner and loader/radio operator sat in the central fighting compartment. The hull was of single skin armour plate on front, rear and top, either rivetted or welded. Welded hulls appeared on variations of Mk. V and





*Cromwell VI 95-mm. howitzer close support tank. Cromwell VIII was similar but with additional armour on hull front and wider tracks.*



*Cromwell IV F—identifiable by 75-mm. gun, driver's side opening hatch and lack of armour thickening on hull front.*  
(Photo: Imperial War Museum)

VII. Detachable armour plate on the sides provided protection for the suspension assemblies which were mounted on a second inner plate of hardened steel. It was a simple and rigid hull design with two transverse bulkheads mounted in front of and behind the fighting compartment.

The driver sat on the right, with the gear change lever between his knees and steering levers on either side. The clutch, steering brakes and main brakes were all hydraulically operated, the systems being fed by a common oil reservoir in this compartment. A parking ratchet was fitted to the main brake pedal but, to avoid straining the hydraulic system, this method could only be used temporarily. The tank had to be put in gear for permanent parking. For vision, apart from two periscopes, the driver had an armoured visor which could be fully opened or, when closed for better protection, he could open a small wicket door in the visor. Access to the driver's compartment was through doors above his seat or through the bulkhead from the turret. In the earlier marks the pair of doors in the roof could only be opened when the turret was in certain positions. This was a serious design fault, making this forward compartment virtually a man-trap if the tank was disabled in action. To remedy this, three further types of door were later fitted to give greater freedom of movement, one providing a loose flap in place of a door, one being similar to the hull gunner's door, where a hinged section of the roof and hull side plates swung horizontally sideways, and ultimately a single upward opening door which incorporated one of the periscopes. An extractor ventilation fan was mounted in the roof



*One of six pilot models of A.24 Cruiser Mk. VII Cavalier produced in January 1942.* (Photo: R.A.C. Tank Museum)



*Cromwell III D—sub-mark indicated by hull gunner's side opening hatch. This vehicle was fitted with track sand shields for Middle East trials.* (Photo: Imperial War Museum)

between the driver and hull gunner, and a similar fan was mounted in the turret above the guns. The 7.92-mm. Besa machine-gun in the hull gunner's compartment was in a ball mounting, controlled and fired manually. A telescopic sight gave direct view through the mounting. One of the few identifying features in the hull of earlier marks before Cromwell IV was a rounded hood over a periscope sight in the roof above the hull gunner. When this was fitted the gunner had no alternative viewing periscope (but Cavalier had both).

The turret crew were carried in the turntable basket which was suspended from and rotated with the turret. The commander sat on the left behind the gunner. There were two types of cupola, both rotated by hand and fitting almost flush with the roof. The early model mounted two episcopes. The later all-round vision cupola, which was introduced with the Mk. VII and later installed in all service vehicles, mounted eight episcopes, one of which could be extended and tilted to give a better view of the ground closer to the tank. The commander had no direct control over the sighting of the guns but a three-pronged sighting vane mounted externally on the forward edge of the turret roof helped him to direct the gunner. The gunner, in his turn, normally used a telescopic sight but, for targets beyond the range of the telescope or which he could not see, he used the AFV sighting gear with range drum and clinometer. The gun elevation was controlled by a handwheel on the gunner's right. Turret traverse was operated by the gunner's left hand, either through a spade grip on the hydraulic powered traverse system or manually by a handwheel which



was marked with a line indicator for semi-indirect shoots. The powered traverse gave complete rotation of the turret in 14 to 15 seconds at top speed, and yet its accuracy was such that it could also be used for fine laying in direct fire. The 75-mm. gun and a co-axially mounted Besa machine-gun were fired mechanically from a pedal on the floor, although later modifications introduced an electrical firing gear operated through a switch on the elevating hand-wheel with a foot pedal mechanism as an auxiliary. The 75-mm. used many parts in the breech mechanism which were identical with the 6-pdr. gun. The barrel was similar, the main external difference being the addition of a muzzle brake. Ammunition stowage for 23 rounds of 75-mm. was provided in the turret for "ready rounds" while the balance of up to 41 rounds was stowed in various positions around the walls of the fighting compartment. The loader/wireless operator was responsible for a two-inch bomb-thrower mounted in the turret roof. This weapon was used for firing protective smoke over variable ranges up to 150 yards (later bombs increased the range to 450 yards). But this crewman's main duties were the operation of the No. 19 Wireless Set in the rear of the turret and listening in to one of the two nets covered.

In the engine compartment, the fuel tanks and two oil bath air cleaners were mounted on either side of the engine. Twin fans and radiators were mounted vertically behind the engine with cooling air being drawn mainly through air louvres in the top and sides, and exhausted to the rear. A Merritt-Brown gearbox, originally used in the Churchill "I" tanks in 1941, was mounted here for the first time in a cruiser tank. From this time forward through to the latest marks of Centurions, this excellent system has been preferred to all other British systems. It was certainly superior to and simpler than the Merritt-Maybach system adapted

both by Germany and the U.S.A. The gearbox incorporated steering controls at each end which, through differential and epicyclic gears, controlled the transmission of power from the engine to either or both tracks. Pulling on one steering lever had the effect of selecting a differential steering gear and slowing the track on the same side while simultaneously speeding up the other, with the radius of turn being dependent upon the gear selected—the lower the gear the tighter the turn. Track brakes were mounted separately for normal braking, both being operated simultaneously from the main brake pedal. The final drive assembly on each side incorporated fixed reduction gears in transmitting power to the track drive sprockets. The high speed (38 m.p.h.) of the earlier marks was too much even for their remarkable Christie-type independent suspension and later models had the reduction ratio in the final drive further reduced to limit the speed. The suspension was adapted from the original Christie design used on the earlier cruisers (A.13 onwards) with stronger components to take the extra weight. The original 14-inch track was also later replaced by a 15.5-inch track to achieve a better weight distribution or ground pressure ratio in modifications to all marks in service.

Externally on the hull, stowage bins for tools, rations, and bedding were fitted on both track guards, one on the left and two on the right, plus a small bin sometimes fitted on the back of the turret. When the driver's compartment was fitted with a side opening door—like the hull gunner's—there was only one bin on the right track guard and extra bins would be fitted to the turret sides.

Other external features on the hull were an exhaust flame deflector cowl—known as the Normandy cowl—fitted over the exhaust pipes at the rear of all Cromwells on operations in Europe to conceal exhaust

*A.30 Challenger Tank Destroyer mounted the 17-pdr. (76.2-mm.) gun on a lengthened Cromwell chassis.*

(Photo: Imperial War Museum)



*Snow camouflage—used for the first time by British armour—assists identification of additional armour plates welded on nose and hull front which characterize this Mk. VII photographed near Sittard, Holland, January 16, 1945.*

(Photo: Imperial War Museum)





flames at night. It was easily detachable and could be added to all marks in service.

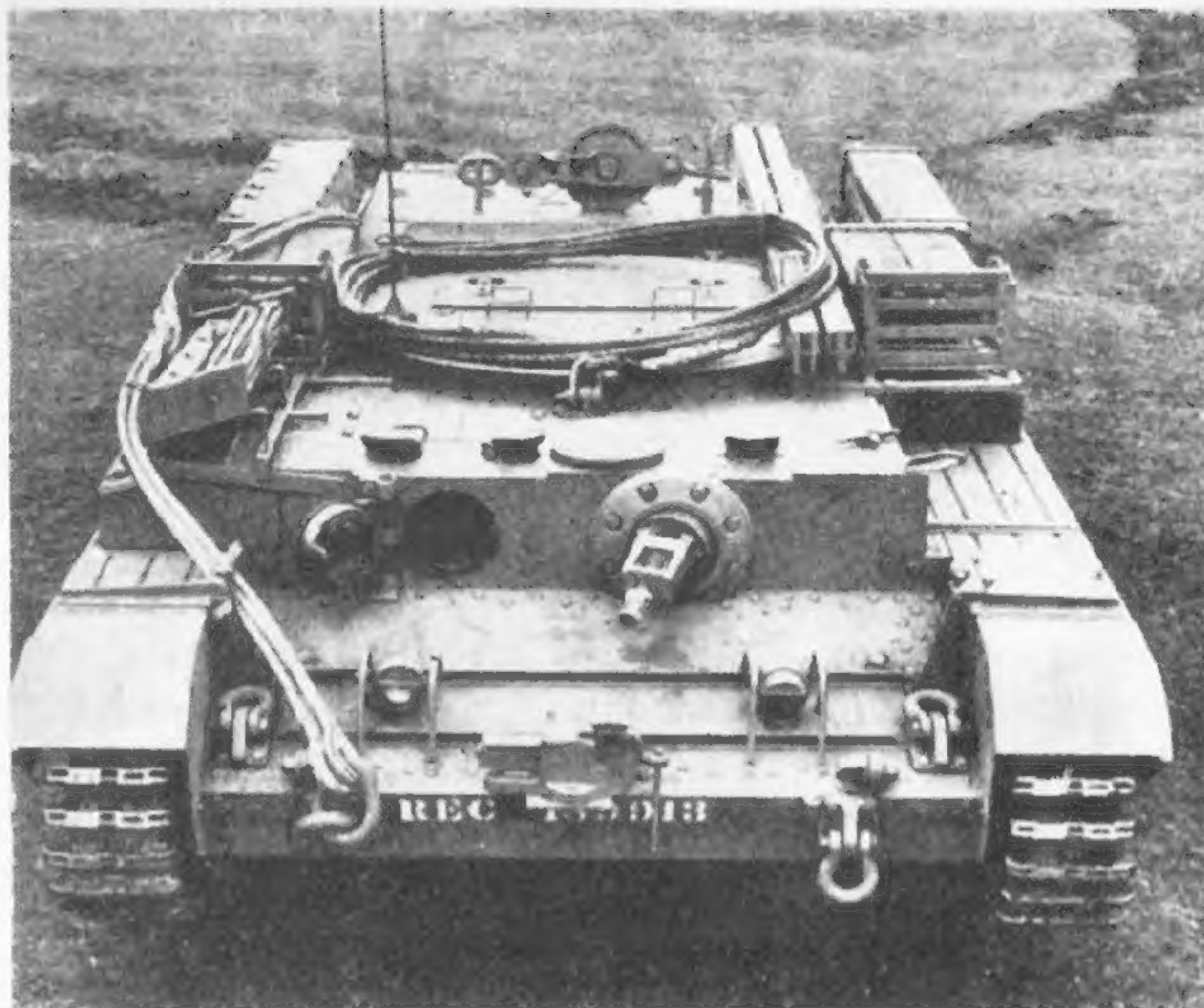
### CROMWELL VARIANTS

The few early Centaur chassis completed as tanks were used primarily as training vehicles. The principal combat version was a batch of 80 Centaur IVs armed with 95-mm. howitzers to operate in the support rôle and issued to the Royal Marine Armoured Support Group for the Normandy Invasion. They were shackled to landing craft and primarily intended to support the beach assault while firing afloat and standing off-shore. However, the Marine tank crews swiftly followed ashore and landed their tanks to support the infantry inland. Centaur chassis were also employed in special rôles:

**Cromwell AOP.** The simplest conversion was for use as an Artillery Observation Post. This involved internal modifications and additional wireless sets which left the tank with the same gun and appearance as that of the armoured units it was supporting.

**Centaur AA Tank.** For use in an anti-aircraft rôle the Centaur AA tank was produced with a twin 20-mm. Polsten turret mounting adapted from the Crusader AA tank. These tanks were on the establishments of armoured units and were landed in Normandy. They were discarded when the threat of enemy air attack diminished.

**Centaur Bulldozer** was based on the Centaur III with turret removed but retaining the hull gunner's position. The dozer blade was attached by arms to the sides of the tank and suspended from a winch. It was used on the basis of one per squadron and it remained



*Cromwell ARV. Hatches over centre compartment conceal twin Bren AA machine-guns on a raisable mounting.*

in service in the Regular Army for many years after the war.

**Cromwell ARV.** This armoured recovery vehicle was a conversion of the basic Cromwell (R-R. Meteor) chassis which dispensed with the turret but retained the forward hull Besa machine-gun. The vehicle was equipped with a two-ton jib crane, hand-operated winch, drawbars, detachable track grousers and sundry recovery equipment. Twin Bren AA machine-guns were mounted in the converted fighting compartment.



*Above left and right: A.30 Challenger Tank Destroyer mounted the 17-pdr. (76.2-mm.) gun on a lengthened Cromwell chassis. Note six road wheels and characteristic high turret.*

*(Photos: Imperial War Museum)*



*A.30 Avenger—SP AT 17-pdr. gun on modified Challenger chassis with open-topped turret.*  
*(Photo: Imperial War Museum)*



*Charioteer was the ultimate development of the cruiser tanks designed in 1950 to mount the Centurion's 20-pdr. gun.*

(Photo: Imperial War Museum)



*A.33(1) Assault Tank—this version used the U.S. T.1 track.*  
(Photo: Imperial War Museum)



### **A.30 CHALLENGER AND AVENGER**

The 17-pdr. (76.2-mm.) gun had been developed from 1941 both as a tank and anti-tank gun and it proved later to be a weapon in the same class as the famous German 8.8-cm. The Birmingham Railway Carriage and Wagon Company was asked early in 1942 to develop the A.30 mounting the 17-pdr. The first pilot model appeared in August 1942, based on a lengthened Cromwell with an extra suspension unit—i.e. six road wheels on each side. The performance of this vehicle was disappointing because the gun was really too big for any of the 6-pdr. tanks, but the design was approved in February 1943 and a limited production order for 200 was completed the following year. The vehicle was named Challenger. The high performance of the 17-pdr. had been a potent factor in the continuing controversy over a dual-purpose gun and Challenger was given the specific rôle of a "tank killer" in support of the other cruisers.

An alternative version of A.30 was also developed in 1943–44 as a self-propelled anti-tank gun and called the Avenger. This was also based on the lengthened Cromwell with a modified suspension incorporating three top rollers above the six road wheels on each side. The gun was mounted in a fully rotating turret with an open top covered by a mild steel plate supported above the armoured sides.

### **A.33 ASSAULT TANK**

The main components of the Cromwell were used as the basis for design of a new heavy assault tank

which was being sought in 1942–43. This was to weigh about 40 tons, mount a 75-mm. gun and have six inches of armour on the front. The English Electric Company undertook this in 1942 and three pilot models were built by May 1944. A.33(1) used the U.S. T.1 track and A.33(2) had a British suspension. With an uprated Meteor engine of 620 b.h.p. it had a speed of 24 m.p.h. and was fast enough in its rôle, but there was no tactical use for a 40-ton tank which only mounted a 75-mm. medium velocity gun. In fact, policy was already changing towards the need for an all-purpose tank and A.33 was overtaken by the Comet, developed by Leyland Motors from the Cromwell.

### **CHARIOTEER**

Yet another late derivative appeared on the scene when in 1950 work started on the design of the Charioteer, intended for service with the Territorial Army as a self-propelled anti-tank gun. This mounted the Centurion's 20-pdr. gun in a rotating two-man turret carried on the normal Cromwell hull. It was in service in 1954 and models also went abroad to Austria and Jordan.

### **TACTICAL EMPLOYMENT**

The Cavalier, Centaur and early Cromwells played a most important part in the training of crews and units in the United Kingdom, and this secondary rôle continued when the American Shermans became available in considerable numbers in 1942–43 and inevitably were adopted as the standard medium tanks for British armoured formations in North Africa and Italy. For the planned invasion in North-West Europe, the ubiquitous hosts of Shermans continued to provide the backbone of medium tank strength of British armoured units. But Cromwell was now available with a comparable performance in fire-power and mobility, and it was planned to equip a proportion of regiments with the new tank. The change was not universally welcome at first because the British cruiser tanks used in the early part of the war had not established a high reputation.

At that time the British armoured division had one armoured brigade (three armoured regiments and a motorised infantry battalion), one lorried infantry brigade and supporting arms and services. Amongst





*Cromwell IV dug in, hull down and replenishing with ammunition. The photograph was taken in January 1945 probably during 7th Armoured Division's advance between the Rivers Meuse and Roer.*

divisional troops there was an armoured reconnaissance regiment intended to carry out close tactical reconnaissance on the divisional front. The rôle of the division had changed little since the beginning of the war and an instruction upon its employment, issued shortly before the invasion, described its main purpose as exploitation. This was the rôle for which Cromwell had been designed, but which it was not able to fulfil until after the break-out from Normandy. The Cromwell went to Europe in the hands of 7th Armoured Division and in the armoured reconnaissance regiments of both the Guards and 11th Armoured Divisions. Later it was issued to the 6th Airborne Reconnaissance Regiment in place of the Tetrarch (Light Tank Mk. VII). The 1st Polish Armoured Division, formed in the United Kingdom in 1942, was also among the units trained on Crusader and Centaur. Their armoured brigade converted to the Sherman in 1943 but the armoured reconnaissance regiment was equipped with Cromwells when they landed in Normandy in August 1944 to fight in 21st Army Group.

In 7th Armoured Division on the Continent of Europe the armoured regiments were organised on the basis of three squadrons of four troops, each of three

*Cromwell IV adapted as Brigade HQ tank. The vehicle carries additional aerials, collapsible hood and brackets for mounting map boards.*



Cromwell 75-mm. and one Sherman Firefly. At Squadron HQ there was a Cromwell 75-mm. for command and two Cromwell 95-mm. assault tanks to give close support with a heavier HE weapon and smoke. The armoured reconnaissance regiments of all British divisions were initially organised on similar lines but with a larger light reconnaissance troop and with three squadrons of five troops, each of three Cromwell 75-mm. In the event they became, in effect, a fourth armoured regiment of the division. Soon their squadrons were re-organised with four troops like the armoured regiments and Challengers were issued on the basis of one per troop to support the Cromwells.

When Cromwell went into action it was already out-matched in firepower by its German opponents but it was superior to them in speed, reliability and, notably, in quick response in laying and firing—qualities which were rewarding when freed from the restrictions of close country when it could out-manoeuvre the heavy tanks and seek out their weak spots. It thus made an effective contribution to decisive actions by the armoured divisions in North-West Europe and, as a proved and efficient weapon, led directly to the design of its successor, the Comet with its hard-hitting 17-pdr. gun.

#### **SPECIFICATION:**

##### **A.27(M) CRUISER MK. VIII CROMWELL IV**

##### **General**

Crew: 5, Commander, gunner, loader/wireless operator, driver, hull gunner.  
Battle weight: 27.5 tons.  
Bridge classification: 28.  
Power/weight ratio: 21.8 to 1 b.h.p./ton.  
Ground pressure: 14.7 lb. per sq. in.

##### **Dimensions**

Length overall, gun to front: 21 ft.  $\frac{3}{4}$  in.  
Height overall: 8 ft. 3 in.  
Width overall: 10 ft.  
Width over tracks: 9 ft.  $3\frac{1}{2}$  in.  
Track centres: 8 ft.  $1\frac{1}{2}$  in.  
Track width: 14 in.  
Length of track on ground: 12 ft. 3 in.

##### **Armament**

Main: QF 75 mm. gun Mk. V and VA.  
Auxiliary: Two 7.92 mm. Besa machine-guns, one co-axially mounted with main armament and one in front of hull.  
Bomb thrower 2 in. mounted in turret roof, right side.  
•303 in. twin Vickers K Type machine-gun with AA mountings or  
•303 Bren light machine-gun. Twin machine-gun and AA mounting later discarded.  
Rear smoke generators: two pairs mounted at rear of hull, fired electrically from driver's compartment.

##### **Fire Control**

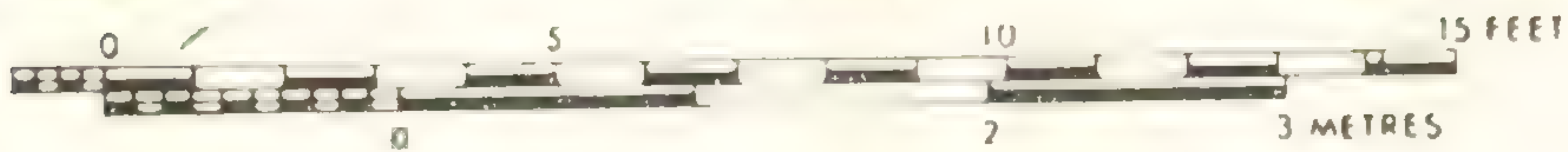
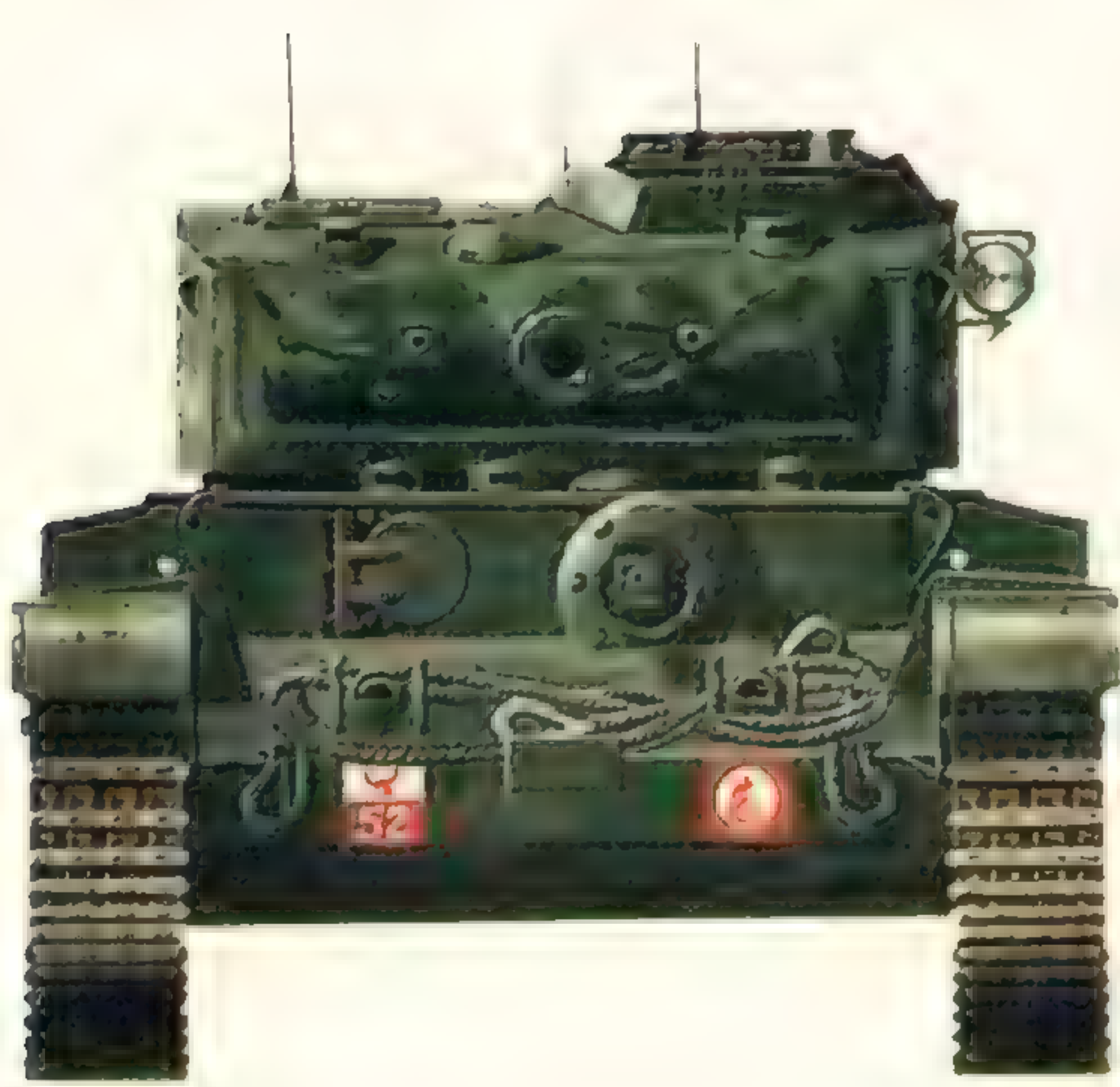
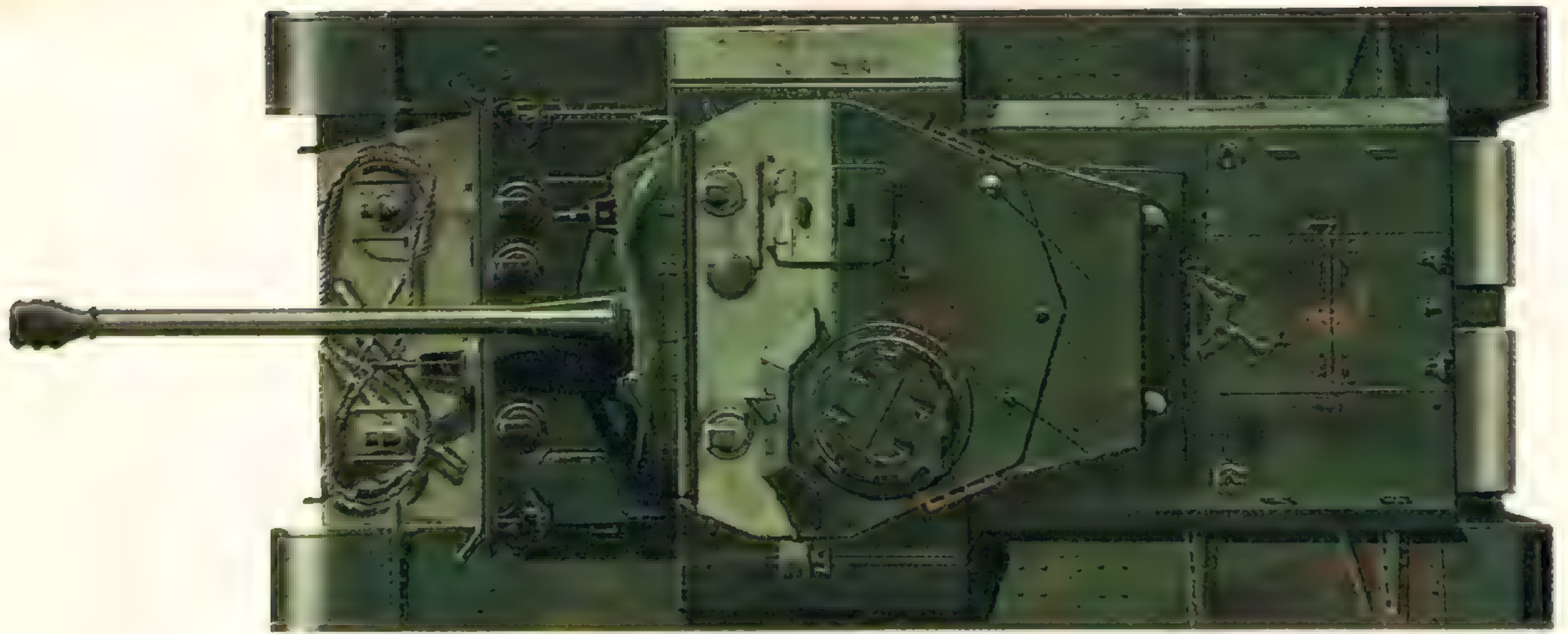
Turret: Manual control of elevation by hand wheel. Traverse by hydraulic power from variable flow pump driven by main engine, with auxiliary hand traverse. Mechanically operated firing gear from pedal on turret floor. (Electrically operated firing gear from switch on hand-wheel introduced in Cromwell VII and VIII, with auxiliary mechanical gear).  
Hull: Ball mounting with limited movement 12° to right and 20° to left, in elevation and depression. Hand control.

##### **Ammunition**

75 mm.	<table border="0"> <tr> <td>HE M48</td> <td rowspan="5">} 64 rounds, proportions varied by types.</td> </tr> <tr> <td>APC M61</td> </tr> <tr> <td>AP M72</td> </tr> <tr> <td>Smoke WP M64</td> </tr> <tr> <td>Smoke Emission</td> </tr> </table>	HE M48	} 64 rounds, proportions varied by types.	APC M61	AP M72	Smoke WP M64	Smoke Emission
HE M48	} 64 rounds, proportions varied by types.						
APC M61							
AP M72							
Smoke WP M64							
Smoke Emission							

N.B.: All types except Smoke Emission were American.  
Besa machine-guns: 4,950 ((22 boxes).  
Vickers machine-guns: 2,000, or Bren light machine-gun: 600.  
Bomb thrower: 30.





Last of the Cruisers: Comet of 1st Royal tank Regiment, 7th Armoured Division, Berlin, 1945. (Although the Centurion, which followed the Comet, started its design life as a cruiser, it was being regarded as a "universal" tank by the time it came into production)

*Martin Lee © Profile Publications Ltd*







*Cromwell IV F OP tanks of 3rd Royal Horse Artillery, 7th Armoured Division in Berlin Victory Parade.*

#### Sighting and Vision

Commander: Standard cupola mounted 2 episcopes. Later all-round vision cupola mounted 8 episcopes giving 360° vision. Both types rotated by hand. Sighting vane mounted externally on turret roof.

Turret gunner: Telescopic sight No. 50 x 3L Mk. I or 2. AFV Sight Gear 75 mm.

Hull gunner: Telescopic sight No. 50 x 1.9 Mk. 1.

Five periscopes (rotating and tilting) mounted in turret and hull roofs for loader, each gunner and driver (2).

#### Communications

Wireless Set No. 19. Two sets. "A" (squadron/regimental net) and "B" (troop net). Intercomm. between all crew. Infantry telephone on rear of hull.

#### Armour

Hull: Rivetted or welded. Detachable armour plate over suspension assemblies mounted on hardened steel plate.

Turret: Rolled or cast. Side armour bolted to welded inner structure.

Hull: Front 63 mm. vertical; Glacis 30 mm./70°; Nose 57 mm./20°; Side 32 mm.; Lower side 25 mm. outer; 14 mm. inner; Rear 32 mm.; Top 20 mm.; Floor 8 mm.; Turret Front 76 mm.; Sides 63 mm.; Rear 57 mm.; and Top 20 mm.

#### Engine

Rolls Royce Meteor, Petrol. 60° V-12. 12-cyl., Water-cooled. 1,649 cu. in. (27 litres). 570-600 b.h.p. at 2,550 r.p.m. Fuel: 116 gallons.

#### Transmission

Clutch: Dry, twin plate, hydraulically operated.

Gearbox: Merritt Brown, type Z.5. Five forward speeds and reverse.

Final Drive: Reduction 4.5 to 1 or 3.71 to 1, according to type

#### Suspension

Christie type, five road wheels each side independently sprung, on pivoting axle arms supported in cross tubes fixed to bottom plate of hull. Hydraulic shock absorbers fitted to front, second, fourth and rear suspension units. Track rests on top of centre road wheels returning round idler (tensioner) at front.

Track: Manganese steel, 125 links each side with centre lugs.

Pitch: 3.93 in.

#### Electrical System

12 volt system, with two 6 volt 150AH batteries mounted in fighting compartment. Auxiliary charging set (single cyl. 4 stroke, air-cooled) mounted behind driver.

#### Performance

Maximum speed: 3.71:1 final drive ratio—38 m.p.h.

4.5:1 final drive ratio—32 m.p.h.

Maximum gradient: 24°.

Vertical obstacle: 3 ft. Trench: 7 ft. 6 in.

Wading depth: 3 ft., of 4 ft. with fording flap closed.

Road range: 173 miles. Cross country range: 81 miles.

#### ARMoured UNITS EQUIPPED WITH CROMWELL FOR OPERATIONS IN N.W. EUROPE

<b>Guards Armoured Division</b>	2nd Batt. Welsh Guards.
<b>7th Armoured Division</b>	8th King's Royal Irish Hussars.
<b>22nd Armoured Brigade</b>	1st Royal Tank Regiment.
	5th Royal Tank Regiment.
	4th County of London Yeomanry (Sharpshooters), (until July 1944).
	5th Royal Inniskilling Dragoon Guards (from July 1944).
<b>11th Armoured Division</b>	2nd Northamptonshire Yeomanry (until August 1944).
	15th/19th The King's Royal Hussars (from August 1944).
<b>6th Airborne Division</b>	6th Airborne Reconnaissance Regiment, R.A.C.
<b>1st Polish Armoured Division</b>	10th Mounted Rifle Regiment.
<b>Royal Marine Armoured Assault Group (with Centaur IV)</b>	

#### A.27 CRUISER MK. VIII SERIES

	Weight Tons	Armament	Engine	Remarks
<b>A24 CRUISER MK. VII</b>				
Cavalier	27	1-6 pdr. 2 Besa	Nuffield Liberty 395 b.h.p.	Fitted to carry auxiliary fuel tank at rear
<b>A27 (L) CRUISER MK. VIII</b>				
Centaur I, II	27.5	1-6 pdr. 2 Besa	Nuffield Liberty 395 b.h.p.	Fitted to carry auxiliary fuel tank at rear
Centaur III	—	1-75 mm. 2 Besa	Nuffield Liberty 395 b.h.p.	Limited number with 75 mm.
Centaur IV	—	1-95 mm. 2 Besa	—	Support tank: 80 issued to Royal Marine Armoured Support Group
<b>A27 (M) CRUISER MK. VIII</b>				
Cromwell I	27.5	1-6 pdr. 2 Besa	Rolls Royce Meteor 570-600 b.h.p.	
Cromwell II	—	1-6 pdr. 1 Besa	—	Wider track, 15.5 in.
Cromwell III (Formerly Cromwell X)	—	1-6 pdr.	—	Centaur with Meteor Fitted to carry auxiliary fuel tank at rear
Cromwell IV	—	1-75 mm. 2 Besa	—	New 75 mm. gun
Cromwell V	—	1-75 mm. 2 Besa	—	Mk. Vw with welded hull Few produced
Cromwell VI	—	1-95 mm. 2 Besa	—	See also Mk. VIII. 95 mm. howitzer for close support
Cromwell VII	28	1-75 mm. 2 Besa	—	} Mk. VIIw with welded hull Both Marks, armour increased mainly on front to 101 mm. Wider tracks, 15.5 in.
Cromwell VIII	—	1-95 mm. 2 Besa	—	

There is little external difference in hull and turret of Centaur III, IV and Cromwell IV-VI. Type differences occurred in each of these Marks:

D—With hull gunner's side opening door.

E—4.5 to 1 final drive reduction ratio replaced 3.71 to 1.

F—With driver's side opening door.

Cromwell VII, VIII are mainly distinguished by extra armour plate fixed to hull and turret fronts, nose and rear.





*Multi-barrel smoke dischargers were fitted after the War, as on other armoured vehicles, arranged in three pairs on each side of the turret. This Comet tank has been renumbered in the new system.* (Photo: R.A.C. Tank Museum)

# Comet

by Major James Bingham

THE demand for a tank with the performance of the Comet can be said to have started in September 1941, although it was not until 18 months later that detailed work began on the A34 project that produced the Comet. But it was in late 1941, after the reverses suffered against German armour in the Middle East, that the General Staff told the Tank Board of their need for both a cruiser and an infantry tank which mounted a high velocity anti-tank gun capable of defeating any enemy armoured fighting vehicle. The infantry tank project to meet this demand got as far as mounting the 3-in. 20-cwt. anti-aircraft gun in a few Churchill hulls, but these were never used for the purpose intended. The cruiser development was more productive and, known as the A30, led to the production of the Challenger which eventually went into service in 1944.

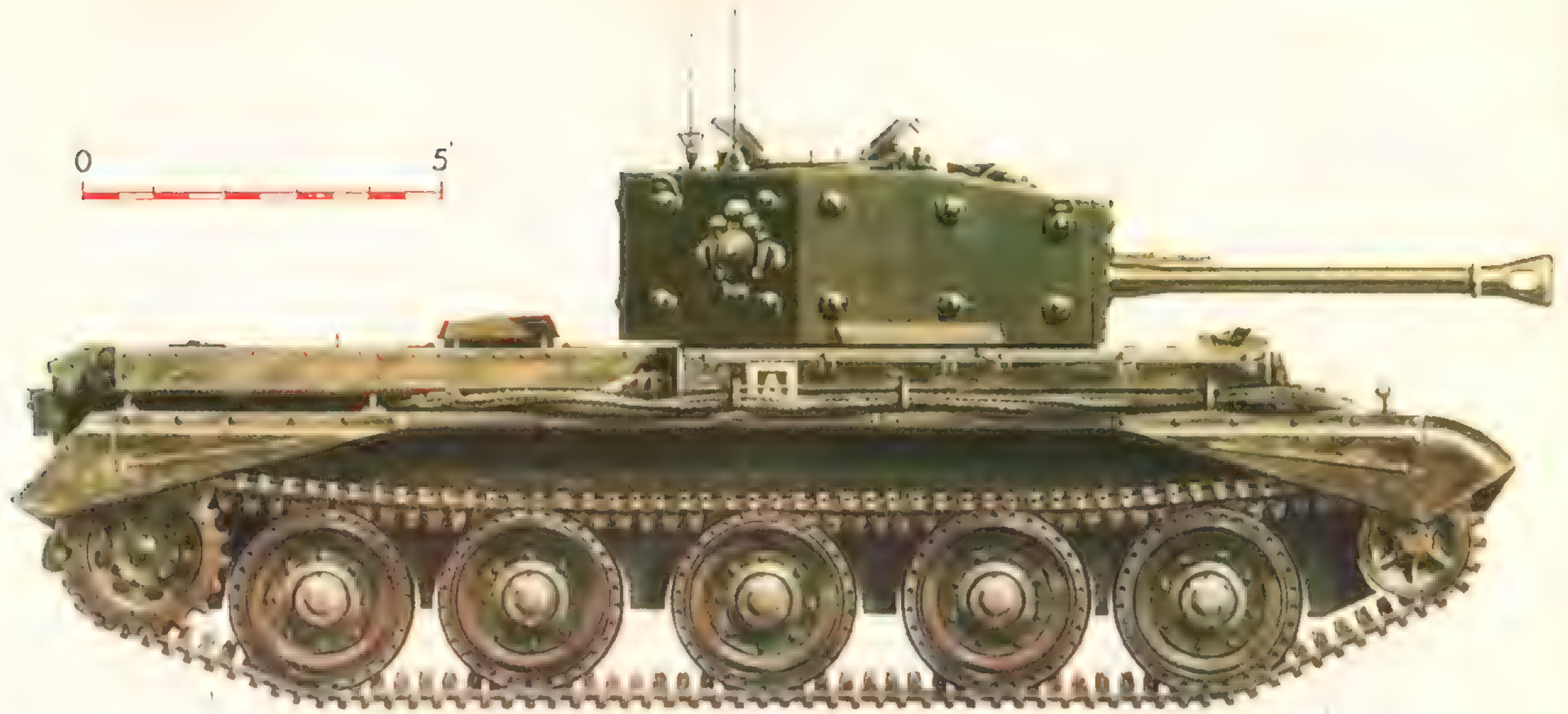
The Challenger, however, was not a great success. The Birmingham Railway Carriage and Wagon Company, the design parents of the A27 (Cromwell) at the time, started development early in 1942 and the first prototype appeared in August, mounting the new 17-pdr. high velocity anti-tank gun on a modified Cromwell hull. Results were disappointing. Specifications demanded a turret crew of four (two loaders), and trials revealed weaknesses which were attributable mainly to the size, weight and stresses of a big gun mounted on a comparatively small hull. Despite the

weaknesses, however, a limited production order was made for the Challenger in February 1943, to be pursued as a matter of high priority, as it was the only vehicle under development which could compete with the German tanks coming into action armed with the long 75-mm. and the 88-mm. guns (Pz Kpfw IV and Tiger).

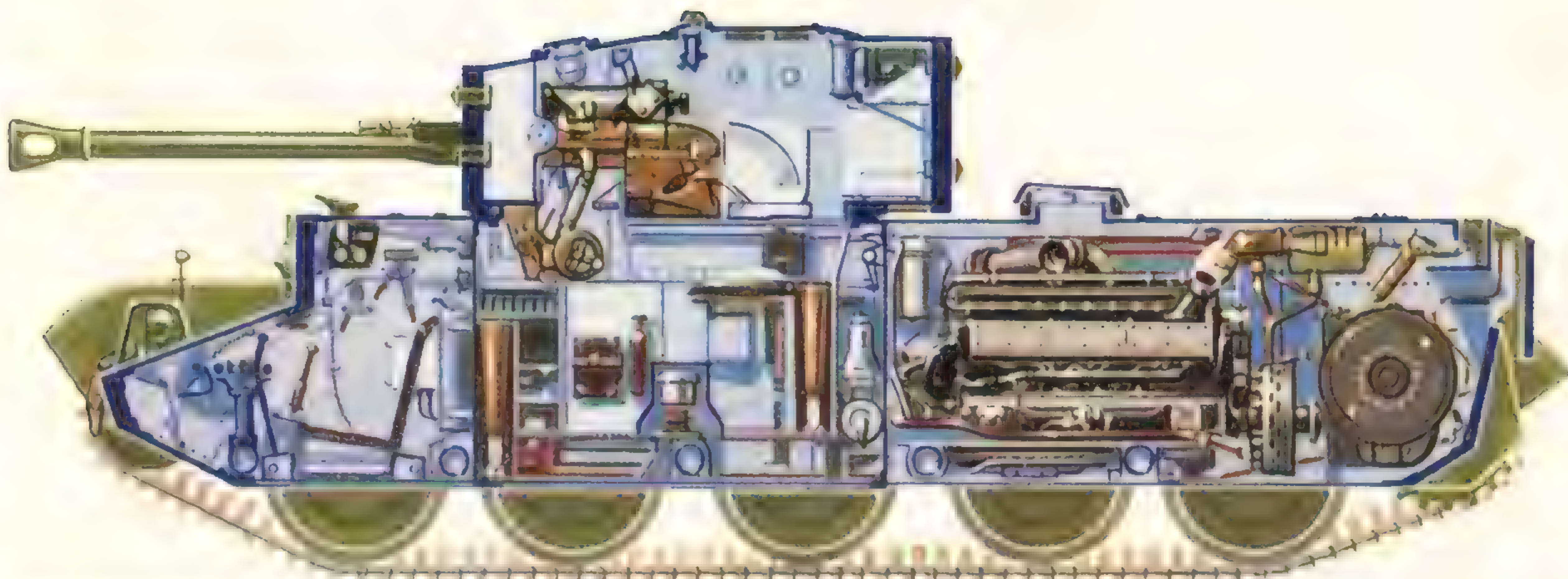
It was in this same period, in January 1943, that official policy on tank armament changed, whereby the majority of medium tanks were to be armed with a dual-purpose, medium velocity 75-mm. instead of the 6-pdr. anti-tank gun. The Tank Board recognized the short-comings of the Challenger against the corresponding demand for a fast, high-powered anti-tank weapon to support the Cromwells armed with the 75-mm., and, at a lower priority than production of the Challenger, turned to the development of another tank, mounting the 17-pdr. or an equivalent type, on the Cromwell chassis—to be known as the A34.

The choice of gun for the new tank was crucial, and the designers were allowed the relative freedom of developing the most effective high velocity gun which could be mounted in the Cromwell, a line of development which was confirmed at War Cabinet level in April. The 17-pdr. was considered but, in effect, the choice remained between a new British gun, known as the High Velocity (HV) 75-mm., and the American 76-mm. which was already in production to arm their

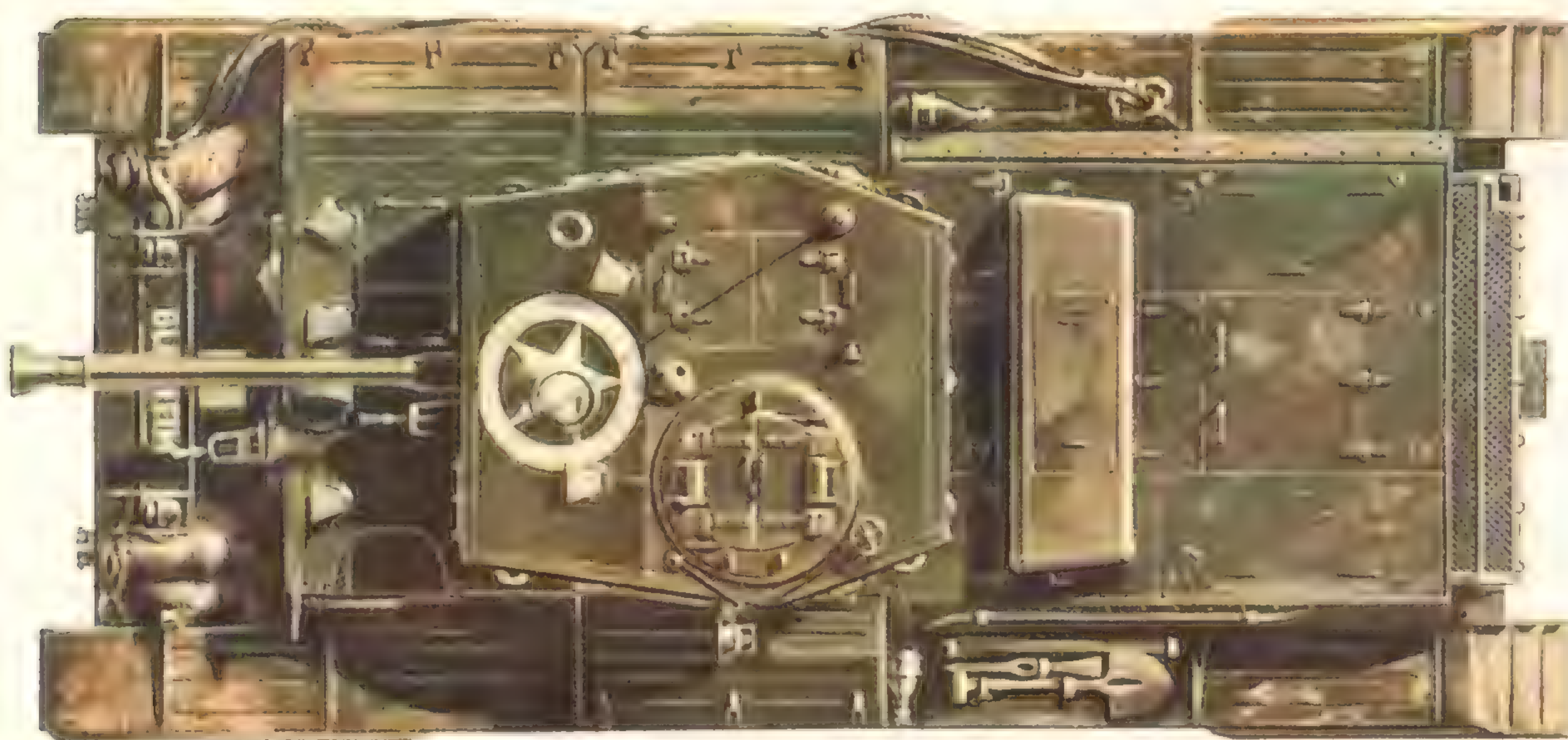




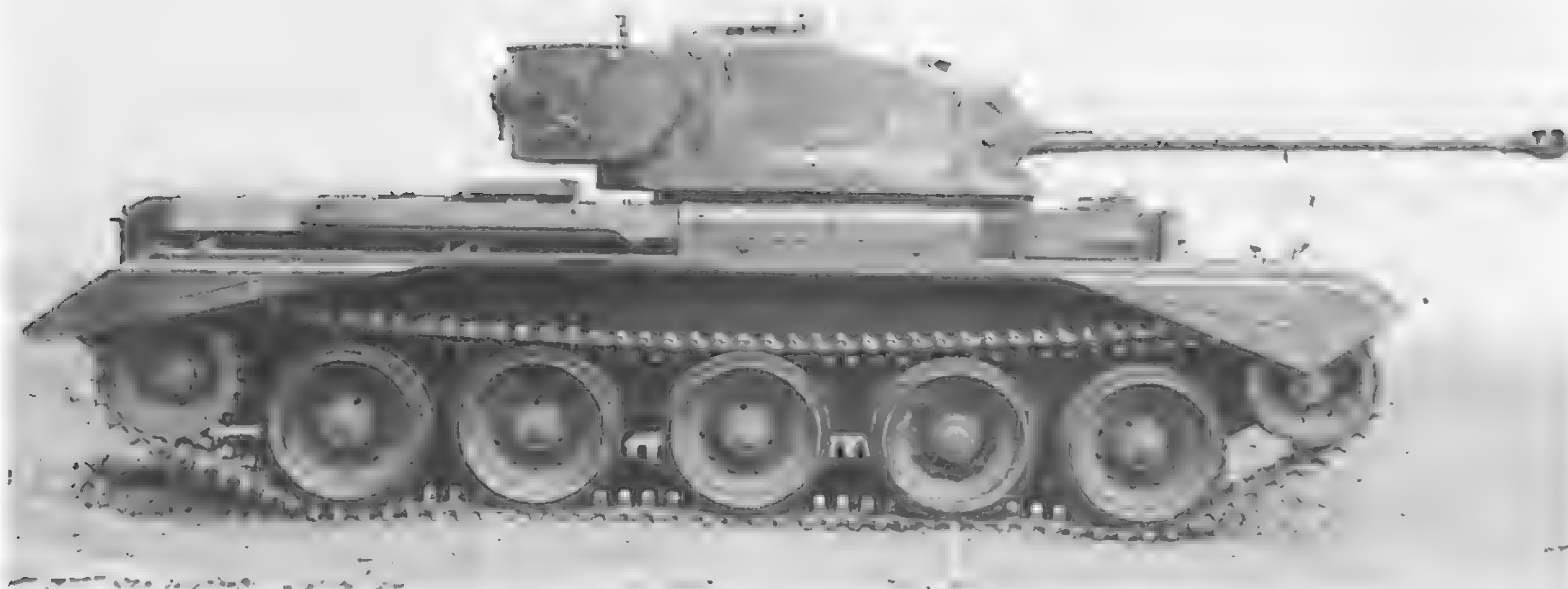




The tank shown here was inspected by Mr. Winston Churchill on a tour of British units "somewhere in England" shortly before D-Day, June 1944. It was commanded by Major J. O. Spencer, Commanding 2 Squadron, 2nd Battalion, Welsh Guards, and driven by Sergeant T. W. Dredge. The Battalion was the Armoured Reconnaissance Regiment of the Guards Armoured Division. It fought throughout the campaign in N.W. Europe to the end of the war. For the Prime Minister's visit the tank carried the Squadron colour—the red dragon pennant—on the "A" Set (right hand) aerial. The signs on the nose plate are (left to right): Unit number 45 on blue and green indicating the armoured reconnaissance regiment of the Division; 26 indicating the bridge classification (later increased to 28); the white square indicating 2 Squadron and the A showing it is the Commander's tank; the shield is the insignia of the Guards Armoured Division. The yellow square on the glacis plate is gas-sensitive paint. The five-pointed Normandy stars were added shortly before D-Day for identification from the air. In these paintings the Commander's hatch in the right and rear elevations and the driver's visor in the front elevation are shown open.







*The first prototype of the A34, ready for firing tests in March 1944. The Cromwell suspension had been strengthened; and the return rollers and a wider track were fitted later.*  
(Photo: R.A.C. Tank Museum)

Tank Destroyers. Selection of the 76-mm. would have involved material alterations to the gun to match British practice in crew positions and turret layout, and the length of the rounds would have restricted handling and loading within the space available. On balance, the only advantages of the 76-mm. lay in interchangeability of ammunition and some relief on British production, and the British gun was eventually chosen. The HV 75-mm. was, in fact, a modified and somewhat less powerful version of the 17-pdr. (76.2-mm.), designed by Vickers-Armstrong to match the tank on which it was to be used. It fired the same shells as the 17-pdr., but had a shorter barrel, reduced muzzle velocity, and a re-designed chamber to accept shorter and wider cases that permitted

easier ammunition handling. To avoid confusion with other British and American guns in service, the new gun was re-named the 77-mm.

Leyland Motors had turned over their factory completely to tank production in 1942 and work started on the new A34 project when the firm was confirmed in February 1943 as design parents for further development of the Centaur/Cromwell series. Taking advantage of the lessons already learned on the Challenger, and also on the three experimental projects A31, A32 and A33 to produce a heavy assault tank based on the Cromwell, design proposals for the new tank were laid before the General Staff in July 1943. By the end of September the mock-up was ready for inspection. The design was based on the

*An early model of Comet, before fitting the 17-pdr. tow bar, and lacking the tank telephone box on the rear armoured plate.*  
(Photo: R.A.C. Tank Museum)







standard Cromwell hull, with additional armour protection and an estimated 3½ tons extra weight. The larger gun naturally required a larger turret but the increased turret ring diameter (57 in. to 64 in.) was achieved without adding a wider centre section to the hull, as had been necessary on the Challenger.

The General Staff confirmed in October their requirement for the A34, mounting the 77-mm., but it was already being regarded as a stop-gap pending the long-term development of a larger cruiser tank carrying heavy armament (the A41 which was to become the Centurion). In the meantime, however, the Challenger had encountered serious production delays and the A34 was the only other tank which met the cruiser requirement; production of the A34 was to proceed with all speed, to get as many as possible in service for the planned operations in Europe in 1944. Orders were placed for three prototypes, plus a hull to be fired at in trials, and it was expected that 20 pre-production models would be ready in June 1944.



*Above: The first A34 Prototype, in mild steel. Side-opening roof doors for both driver and front gunner were fitted on all Comets, as on the later types of Cromwell. This meant that both could get out, whatever the position of the turret.*

*(Photo: R.A.C. Tank Museum)*

*Top left: An early model of the Comet. Later production models had a bracket welded on to the centre of the nose plate to hold up the tow rope when stowed on the glacis plate.*

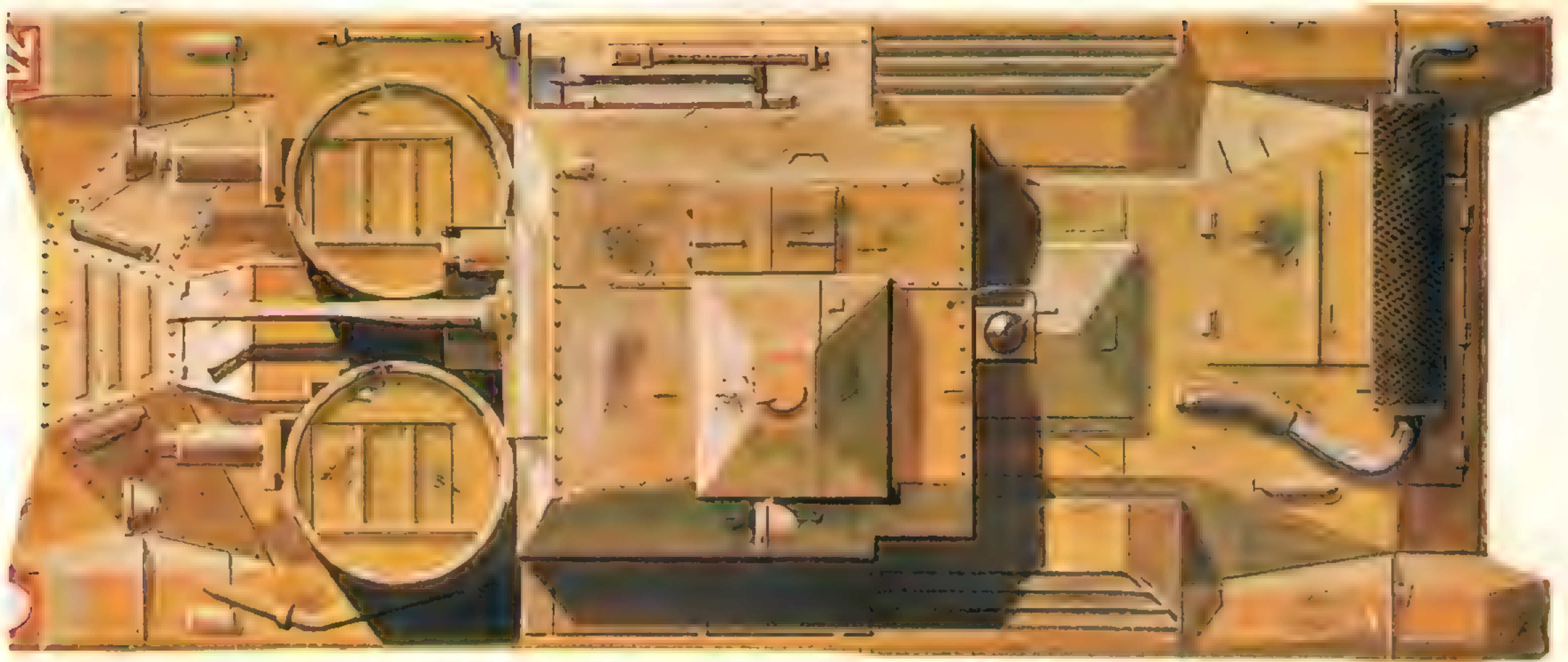
*(Photo: R.A.C. Tank Museum)*

*Below: Rear of the Comet Type A, which retained the Cromwell exhaust system. A cowl was normally fitted over the back end for concealment and protection against exhaust flames projected upwards. Note the addition of the 17-pdr. tow bar, which has caused the two smoke dischargers to be moved up on to the rear armoured plate.*

*(Photo: R.A.C. Tank Museum)*

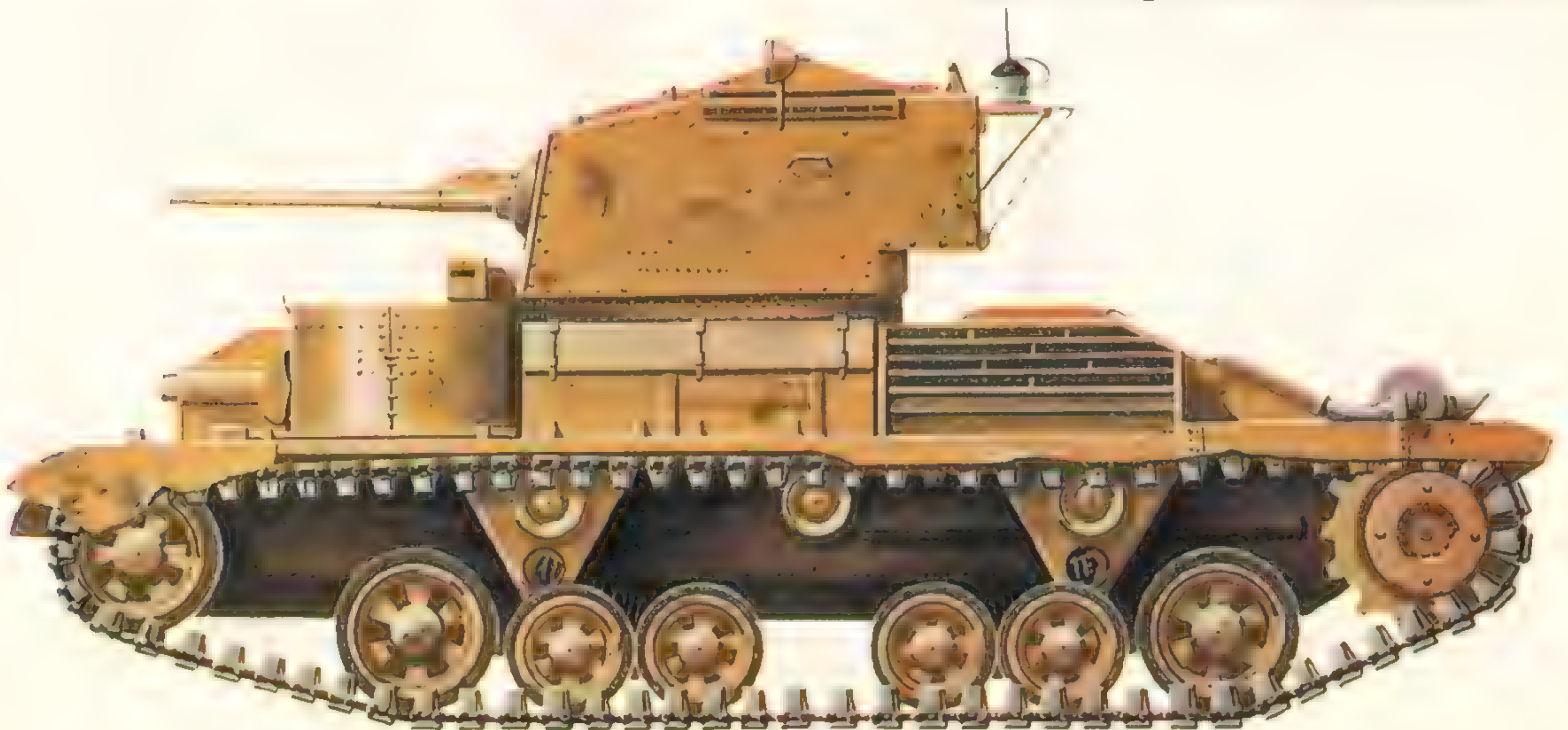




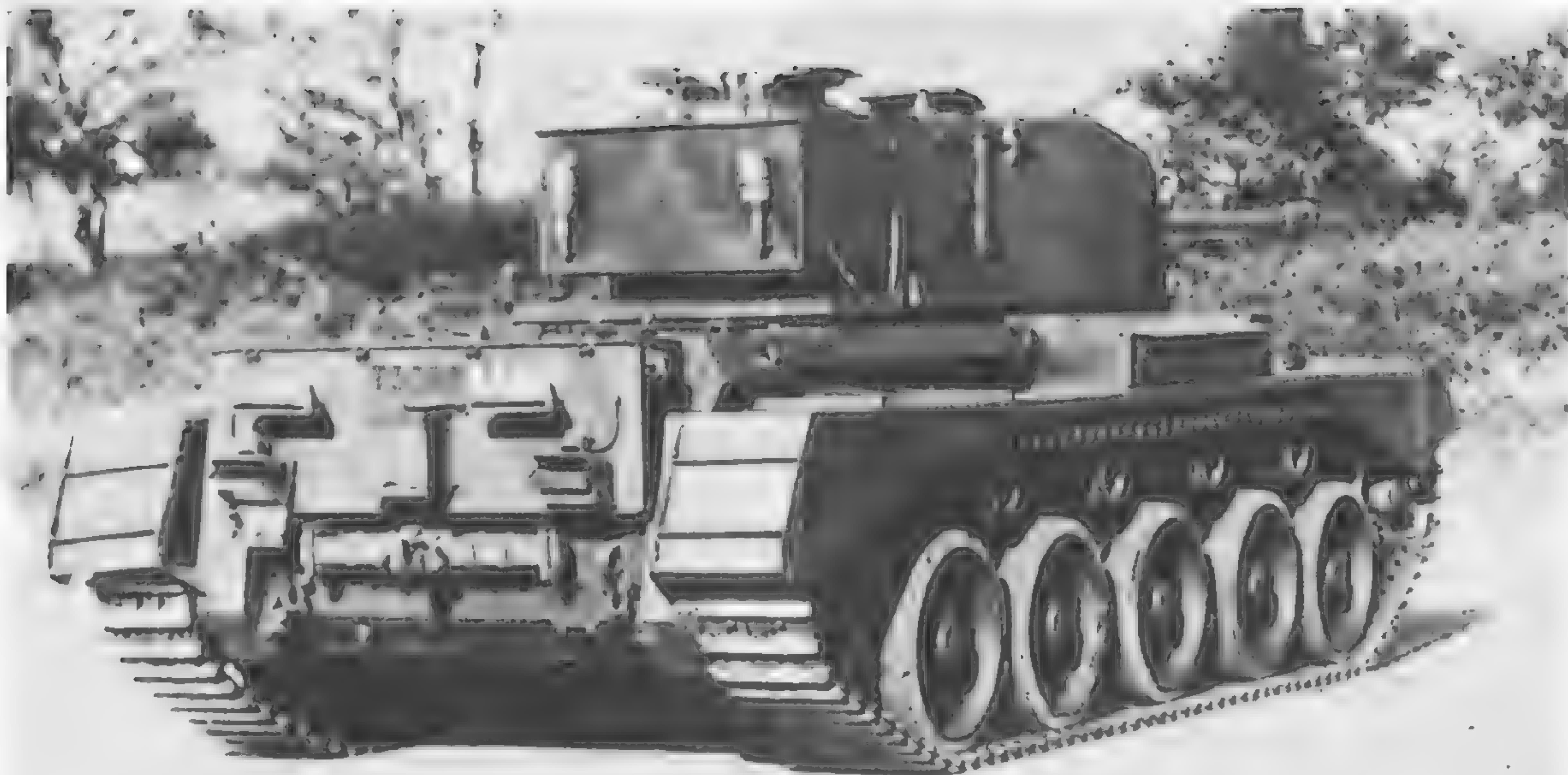


First of the Cruisers: A9 of 1st Royal Tank Regiment, 7th Armoured Division, Egypt, 1940.

*Martin Lee © Profile Publications Ltd*





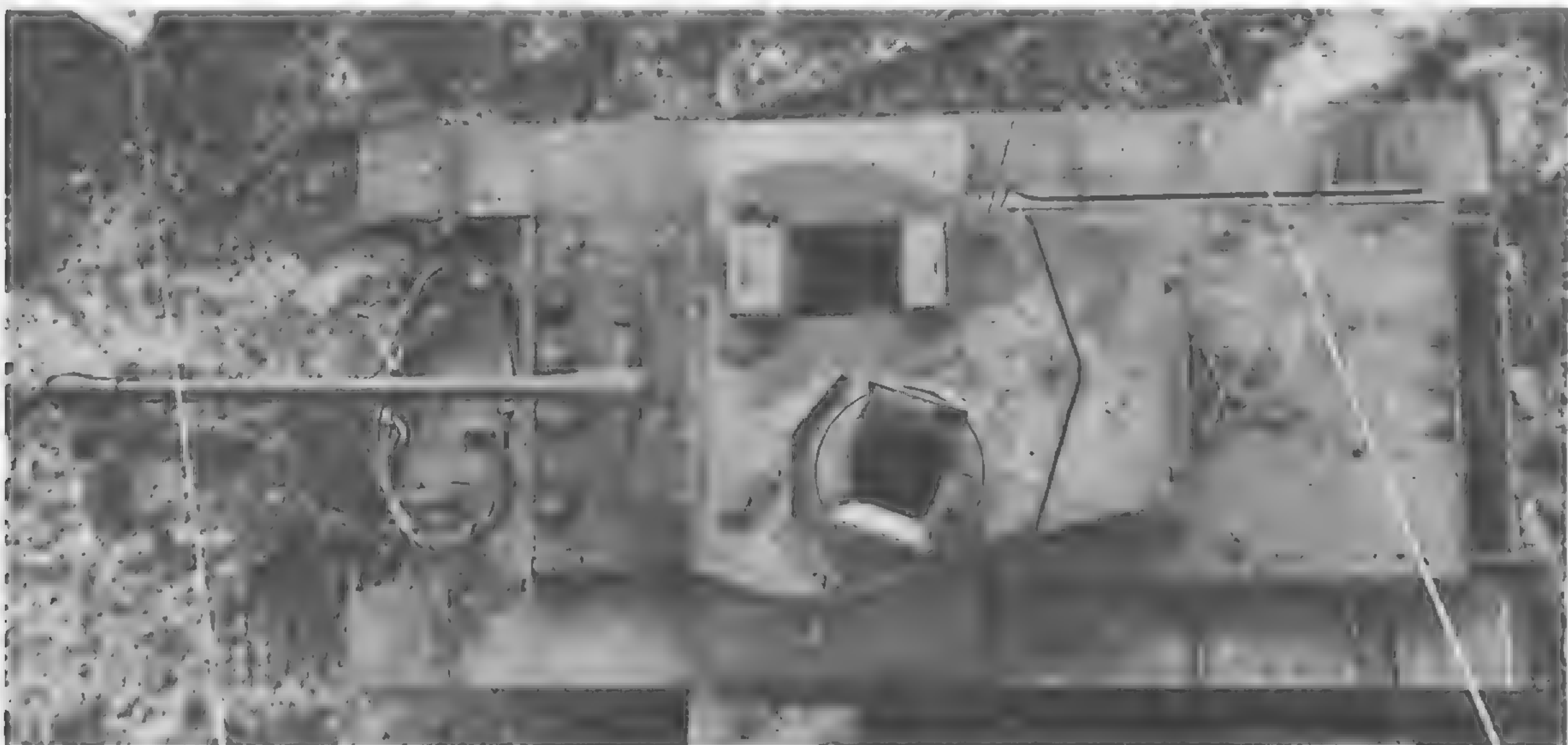


*The Comet Type B, in which the exhaust pipes have been led to twin armoured fishtails mounted on the rear armoured plate. Note that the top of the armoured plate has been raised to the level of the engine deck. (Photo: R.A.C. Tank Museum)*

The first mild steel prototype was delivered in February and firing trials started the following month. Results this time were encouraging. The performance of the 77-mm. as an anti-tank gun was only slightly inferior to that of the 17-pdr., but the gun made up for this, at least in part, by its impressive accuracy and by the demonstration of its power with high explosive. Thoughts on further development of the A34 to mount the 95-mm. close support weapon were quickly dismissed, since the next stage in major development was to be the A41, and further design work on the A34, now named Comet, was confined to modifications and minor improvements.

There were criticisms from those with battle experience, particularly on the retention of the hull gunner and on the protection afforded by the belly armour against mines, but, even though these were set aside in order to avoid re-design, the optimistic early forecasts of production were not achieved. Modifications and changes of equipment caused delays and it was not until September 1944 that the first production models were delivered. Operational tanks were ready in November and were sent to Belgium to start the training and conversion of armoured regiments which would be re-equipped with the Comet.

*Overhead view of the Comet, showing the basic similarity to the Cromwell hull fittings and layout, and emphasizing the overhang of the large turret bin. (Photo: R.A.C. Tank Museum)*







*Soon after the start of operations with Comets, tanks of the 3rd Royal Tank Regiment move through a devastated German town, March 1945.*  
 (Photo: Imperial War Museum)

*A Comet of the 2nd Fife and Forfar Yeomanry, named Saint Andrew, moves up at Petershagen to the Weser bridgehead, April 1945.*  
 (Photo: Imperial War Museum)







*Replenishing ammunition for a Comet of the 2nd Fife and Forfar Yeomanry in position overlooking the River Elbe, with infantry of the 1st Bn. Herefordshire Regiment, April 1945.*  
(Photo: Imperial War Museum)

### DESCRIPTION

The Comet was essentially an up-gunned, up-armoured Cromwell, retaining the same lay-out, the same armament except for the main gun, and using many of the same components, but for all practical purposes it was a new tank. It was never extended to more than one Mark, and there was only one Type variation, introduced in post-war tanks, in which the visible change was the addition of fish tail exhaust pipes on the rear armoured plate.

The hull was of all-welded construction, and incorporated the side-opening door for both driver and hull gunner which had been features of some later Type variations of the Cromwell. The turret, also, was all-welded, with the sides and rear consisting of three bent armour plates, and cast armour at the front. Additional thickness of armour plate was incorporated in construction and this, with the larger turret and weapon system, put the weight of the tank up to nearly 33 tons, almost 5 tons heavier than the latest

*Soldiers of the 1st Bn. Herefordshire Regiment being carried forward on Comets of the 3rd Royal Tank Regiment. The nearest tank has the Cromwell exhaust cowl, with no space in the centre for the gun when in the travelling position in the gun crutch.*

(Photo: Imperial War Museum)







*Field Marshal Montgomery taking the salute as Comets of the 1st Royal Tank Regiment drive past in Berlin, September 1945. The tanks carry the sign of 7th Armoured Division, as well as the 22 Armoured Brigade sign above the unit number.*

*(Photo: Imperial War Museum)*

up-armoured Cromwell. The Meteor engine had the power to absorb this weight penalty and, with strengthened suspension units, a wider track and return rollers, the tank retained the performance of a fast cruiser tank with good cross-country ability.

Fire control arrangements in the turret were essentially similar to those in the Cromwell VII and VIII, with improved sighting gear, but, instead of the hydraulic power traverse system which had been used on all cruisers since the A9, the Comet mounted an electrical power traverse adapted from that successfully used on the Churchill. The electrical system was powered by a generator driven by the main engine. A welcome improvement in ammunition stowage provided armoured bins that reduced the risk of fire caused by flying splinters and molten metal if the tank hull were penetrated, while additional space for stowage was provided in racks beneath the turntable floor. The increasing emphasis on good communications between tanks and infantry, demanded in 1944, is shown by the addition of the No. 38 Set (Infantry) mounted alongside the No. 19 Set at the rear of the turret, thus allowing the tank commander to talk on three separate frequencies, on the squadron/regimental net, to tanks in his own troop and to the infantry with whom he was working.

With only two stowage bins on the track guards, one each side, extra space was provided in the large, external turret bin at the rear for the larger and heavier items of equipment. This, with spare track plates slung near the back, served a dual purpose as counter-weight in balancing the turret.

On the original, Type A, Comet two exhaust flame

deflector cowls were normally fitted, with a space between for the gun when traversed to the rear and clamped in the travelling crutch. These cowls, similar to the single unit originally fitted on the Cromwell for operations in Normandy to conceal exhaust flames at night, became important also as a protection for the infantry who might be carried into battle on the engine deck. On the Type B Comet, with fish tail exhaust pipes, the cowls were not necessary.

### COMET IN SERVICE

The armoured units of 11th Armoured Division were selected to be the first for re-equipment with the Comet, and early in December 1944 29th Armoured Brigade was withdrawn from the fighting in southern Holland to hand in their Shermans near Brussels. This had hardly been completed when the Germans opened their surprise offensive through the Ardennes in December, and the brigade hastily drew up their Shermans again to take part in the fighting to hold and drive back the German threat. Three weeks later, in mid-January, 29th Armoured Brigade was back in North-West Belgium to resume its training and conversion programme.

The armoured brigade units converting were the 23rd Hussars, the 3rd Royal Tank Regiment and the 2nd Fife and Forfar Yeomanry, and the change was generally "viewed with enthusiasm, for though (the) Shermans had given excellent service mechanically—many had survived a far greater mileage than anybody had anticipated—a new toy is always good for morale and this toy looked attractive enough."\*

\**Taurus Pursuant—A History of 11th Armoured Division.*





Above: Leading on to a transporter, a Comet Type B clearly shows the fittings on the engine deck and the turret top, including the armoured deflector shield in front of the commander's cupola.

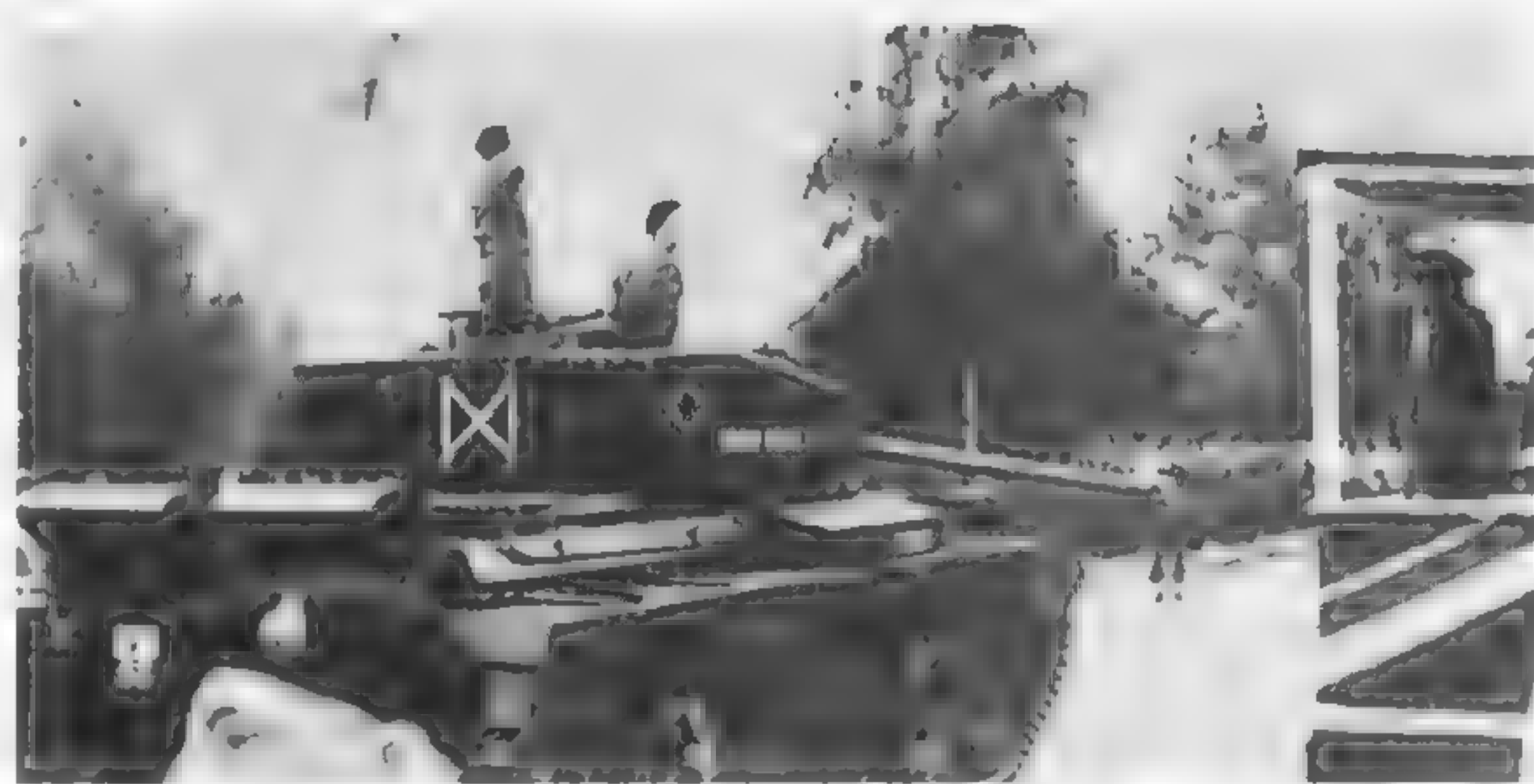
(Photo: R.A.C. Tank Museum)

Right: The Commanding Officer of the 1st Royal Tank Regiment, in his tank Iron Duke IV, passing Field Marshall Sir Bernard Montgomery during an inspection in Berlin, September 20, 1945. The C.O. was Lt.-Col. P. R. C. Hobart. In the foreground of the picture is Maj.-Gen. Sir Percy Hobart, who commanded 79th Armoured Division. At that time Field Marshal Montgomery was a Colonel Commandant of the R.T.R.

(Photo: R.A.C. Tank Museum)

Below: A post-war Comet Type A—with exhaust cowl—showing clearly the blade vane sight on the turret roof for the commander. Also shown is the protection piece welded on to the glacis plate to protect the join with the vertical front plate.

(Photo: R.A.C. Tank Museum)







Changing the 77-mm. gun barrel in workshops.

(Photo: R.A.C. Tank Museum)

"At first, crews were inclined to compare them unfavourably with the Shermans. Everyone, however, was unanimous that the new gun was a miracle of accuracy. There was some disappointment, though, about its penetrative powers. When it was tried against a German Panther it did not have the expected effect against the front plate. For two months the thorough training in the new tank and increasing familiarity with it bred an increasing respect for this speedy and splendid fighting weapon."\*\*

The 15th/19th The King's Royal Hussars, the divisional armoured reconnaissance regiment which had been equipped with Cromwells, was also converted to Comets, and at the end of March 11th Armoured Division moved forward to concentrate in the Wesel bridgehead across the Rhine. From then until the end of the fighting five weeks later, when the division reached the Baltic coast at Lubeck, the Comets proved themselves to be effective, fast and thoroughly reliable. There was no occasion then for the Comets to be tested in a major tank *versus* tank battle, although they frequently came up against stubborn resistance by tanks in ones and twos supported by guns and infantry armed with "bazookas", and in these circumstances the comparative weakness of the 77-mm. as an anti-tank weapon was not so vital. Its superior performance with HE, as compared with the 75-mm., was a particular advantage. As the advance progressed against centres of fierce oppo-

sition, it became normal for infantry to be carried with the leading tanks in closely knit groups.

When the fighting in Europe was over, the re-equipment programme continued and by the end of the summer 22nd Armoured Brigade, in 7th Armoured Division, which had fought throughout the campaign with Cromwells, had converted to Comets, retaining their Cromwell 95-mm. at squadron headquarters as close support tanks. In August the 1st Royal Tank Regiment entered Berlin with their Comets and took part there in the Allied Victory Parade.

Successively, armoured units deployed amongst the Occupation Forces were re-equipped with Comets (and Cromwells for their squadron headquarters and reconnaissance troops), and were then deployed to the Canal Zone in Egypt and amongst those who were keeping the peace in Palestine. It is said that one commanding officer was offered £250,000 for every Comet he was prepared to "lose", payable in any currency! The Comet was an effective deterrent where a show of force was required, but it was still a stop-gap pending the introduction of Centurion, and in early 1949 re-equipment with Centurion reached the Middle East after the programme was virtually completed in Europe. Nevertheless, Comets remained in service with the Regular Army for many more years, in Berlin until 1957 and in the armoured regiment in Hong Kong until late 1959. Some of the Centurions that went to Hong Kong were already veterans of battles in Korea and of trouble spots in the Middle East.

\*\**The Fife and Forfar Yeomanry 1919-1956* by R. J. B. Sellar, William Blackwood & Sons Ltd.



The Comet's greatest contribution to training in the United Kingdom was in the Territorial Army which was re-constituted in 1947, and for the next decade Comets and Cromwells together met the extensive demands for tanks in the training of armoured regiments in the Territorial Army. Even in 1969 the Comet and Cromwell, albeit non-runners, were represented in service with the Territorial and Army Volunteer Reserve.

### COMMENTARY

The Comet was the last developed British tank to be used in battle during World War II, and the last in the line of cruiser tanks, if one discounts the Centurion to which it contributed in development but which, by the time it came into production, was being regarded as the "universal" tank.

As mentioned earlier, there was strong criticism of the Comet from users, over the retention of the hull gunner's position behind the vertical front plate, and over the weakness of belly armour as a protection against mines, which became an ever increasing threat in the later stages of the European campaigns. These criticisms might have been met without incurring undue delay in production had they been foreseen during the early stages of design but, as it was, the Comet was ready only just in time to take part in the fighting. In fact, it was the finest tank for its rôle that the British tank crews had had, and the

*Taking a jump at a demonstration. The Christie suspension allowed a fast and stable platform for the gun, but it was not a strong enough system for the heavier Centurion tank that was to follow the Comet in British service.*

(Photo: R.A.C. Tank Museum)



*A Comet and Cromwell still in service in 1969, but no longer as runners, being used for training in loading tank transporters of the Territorial and Army Volunteer Reserve.*

(Photo: The Waggoner)





Comet went a long way towards catching up with its nearest German equivalent, the Panther. This one would have expected in the last few months of the war after years of experience, but let the historian of the 15th/19th Hussars have the last word.

"The Comet, unlike many previous British Cruiser tanks, was reliable and battleworthy from the first—a statement that bodes well for the future but provides a sorry epitaph on British tank provision before and during the war."\*

\**History of 15/19 The King's Royal Hussars 1939-1945* by Major G. Courage. Gale and Polden.

## AFV Series Editor: DUNCAN CROW

### SPECIFICATION—A34, CRUISER TANK, COMET

#### General

Crew: 5—commander, loader/operator, driver, hull gunner.

Weight, laden: 32.7 tons.

Bridge classification: 32.

Power/weight ratio: 18 to 1 b.h.p./ton.

Ground pressure: 13.85 lbs/sq. in..

#### Dimensions

Length overall, gun front: 25 ft. 1½ in.

gun rear: 21 ft. 6 ins.

Height overall: 8 ft. 9½ ins.

Width overall: 10 ft. 1 in.

Width over tracks: 9 ft. 10½ ins.

Track centres: 8 ft. 4½ ins.

Track width: 18 ins.

Length of track on ground: 12 ft. 11 ins.

#### Armament

Main: QF 77-mm.

Auxiliary: Two 7.92-mm. Besa machine-guns, one co-axially mounted with the main armament and one in the hull front.

Bomb thrower 2-in. mounted in turret roof.

Bren .303 light machine-gun stowed in rear turret locker.

Rear smoke dischargers, two pairs mounted at rear of hull.

#### Fire control

Turret: Handwheel control of elevation (+20° to -12°).

Power traverse by Lucas electric motor (max. 15°/sec.), with auxiliary hand traverse. Electrically operated firing gear with auxiliary mechanical gear.

Hull: Ball mounting, hand control.

#### Ammunition

77-mm.: 61 rounds (APCBC and HE).

Besa machine-guns: 5,175 (23 boxes).

Bren light machine-gun: 600.

Bomb thrower: 20.

#### Sighting and Vision

Commander: All-round vision cupola, rotating 360°, mounting 8 episcopes, Sighting vane mounted externally on turret roof.

Turret gunner: Telescopic sight No. 57 × 3 ML Mk. 1, AFV Sight Gear 77-mm. Comet No. 1, Mk. 1.

Hull gunner: Telescopic sight No. 57 × 1.9 Mk. 1.

Five periscopes (rotating and tilting) for each gunner, loader and driver (2).

#### Communications

Wireless sets No. 19 and No. 38 B. Intercomm. between all crew.

Infantry telephone on rear of hull (in box incorporating First Aid kit).

#### Armour

Hull: Welded. Detachable armour plate over suspension assemblies.

Turret: Welded, cast front.

Hull: Front 76 mm. vertical.

Glacis 32 mm./70°.

Nose 63 mm./20°.

Side 32 mm.

Lower side 29 mm. outer; 14 mm. inner.

Rear 32 mm.

Top 25 mm.

Floor 14 mm.

Turret: Gun mantlet and Front 101 mm.

Sides 63 mm.

Rear 57 mm.

Top 25 mm.

#### Engine

Rolls Royce Meteor Mk. 3, Petrol. 60° V-12, water-cooled, 600 b.h.p. at 2,550 r.p.m. Fuel 116 gallons.

#### Transmission

Clutch: Borg and Beck, dry, twin-plate, hydraulically operated.

Gearbox: Merritt-Brown, type Z.5.

Final Drive: Reduction 4.5 to 1.

#### Suspension

Christie type, five pairs of road wheels each side—similar to that on Cromwell but strengthened. Return rollers mounted above road wheels.

Track: Web-spudded.

Pitch: 4.39 in.

Links: 114.

#### Electrical System

12 volt system. Tiny Tim auxiliary charging set.

#### Performance

Maximum speed: 32 m.p.h.

Maximum gradient: 35°.

Vertical obstacle: 3 ft.

Trench: 8 ft.

*The 3rd/4th County of London Yeomanry (Sharpshooters) training with a Comet and a Cromwell 95-mm.*

(Photo: 3rd/4th County of London Yeomanry (Sharpshooters))





# AFV/Weapons Profiles

**Edited by DUNCAN CROW**

Starting with AFV/WEAPONS PROFILE 24 the Publishers intend to step up the frequency of publication. This departure, taken in order to meet the great demand for coverage of more AFVs more quickly than in the programme that has been running for the past two years, has necessitated some further re-arrangement in the list of titles.

## **26 Hellcat, Long Tom, and Priest PLUS Complete Check List of All U.S. World War II S.P.s**

Three famous American self-propelled guns of World War II. The Priest was first used by the British at Second Alamein. Also a list of all the S.P.s built by the Americans. The author and publishers believe this is the first time such a list has been produced: BY COLONEL ROBERT J. ICKS, author of *AFV Profile 16* and *AFV/Weapons Profile 24*.

## **27 Saladin Armoured Car**

For over ten years the British Army has been using these highly successful armoured cars in trouble spots around the world. At least fourteen other countries also use them. With the Saracen Armoured Personnel Carrier, also described in this Profile, Saladin is always in the news: BY MAJOR MICHAEL NORMAN, now serving with the *1st Royal Tank Regiment*, author of *AFV Profile 17* and *AFV/Weapons Profiles 18, 19 and 23*.

## **28 Swedish S-Tank**

Sweden's remarkable turretless tank with adjustable, hydro-pneumatic suspension for altering the hull pitch to elevate or depress its 105-mm. main armament. For traversing, the whole vehicle must be turned: BY R. M. OGORKIEWICZ, of the *Imperial College of Science and Technology*, one of the world's leading experts in the design of combat vehicles, author of *Design and Development of Fighting Vehicles* and *Armoured Forces*.

## **29 M4 Medium (Sherman)**

Perhaps the best-known and certainly the most widely produced tank in the history of armoured warfare the Sherman was first in action in October 1942, and was still on active service in the Middle East in 1971. This PROFILE gives a full account of the Sherman and its variants—apart from the Specials dealt with in *AFV/Weapons Profiles 20 and 35*: BY PETER CHAMBERLAIN AND CHRIS ELLIS, authors of *British and American Tanks of World War II* etc., and *AFV Profiles 3, 4, 7, 10, 11, 13, and AFV/Weapons Profile 20*.

## **30 Armoured Cars—Marmon-Herrington, Alvis-Straussler, Light Reconnaissance**

The South African-built Marmon-Herringtons were familiar to all armoured car regiments in the Middle East in World War II; although only a handful of Alvis-Strausslers were used these were a significant advance in the design of wheeled fighting vehicles; the section on Light Reconnaissance Cars describes the vehicles that equipped the Reconnaissance Corps formed in 1941 to provide reconnaissance units for infantry divisions: BY B. T. WHITE, author of *British Tanks and Fighting Vehicles 1914-1945*, *Tanks and other Armoured Fighting Vehicles 1900-1918*, etc., and *AFV Profiles 1, 6 and AFV/Weapons Profile 21*.

## **31 Australian Cruiser-Sentinel; and Australian Matildas**

Designed and built in Australia during World War II the Sentinel was a remarkable achievement for a limited engineering industry, and in its cast hull, for a tank of this size, it preceded the American M48 by about 10 years; it was not the Sentinel, however, that was used in action in the South-West Pacific by the Australians but the Matilda, for which they developed specialised equipments and tactics: BY MAJOR JAMES BINGHAM, *Royal Tank Regiment*, author of *AFV Profile 8* and *AFV/Weapons Profile 25*.

## **32 M6 Heavy and M26 (Pershing)**

This Profile describes the curious history of the U.S. M6 Heavy Tank and highlights the fierce controversy that raged over "giant" tanks—not only in the United States, it must be added; the M26, named after General Pershing, also started life as a heavy tank, and a few were in action in Germany in 1945. In May 1946 the Pershing's designation was changed from Heavy Tank M26 to Medium Tank M26, and as such it fought in Korea along with the M46 and M47 Mediums (Patton) that were a re-built version of it: BY COLONEL ROBERT J. ICKS, author of *AFV Profile 16* and *AFV/Weapons Profiles 24, 26*, who has a close knowledge of the tanks' development.

## **33 German Armoured Cars**

As light tanks became popular in the 1930s the importance of armoured cars declined . . . except in Germany and France; Germany attached great importance to them and they were the basic vehicles of the Panzer divisions' reconnaissance units in World War II, achieving great success as this Profile shows: BY MAJOR-GENERAL N. W. DUNCAN, whose distinguished military career in armour has included service in armoured cars in the *Royal Tank Corps*, and command of the *30th Armoured Brigade* in *79th Armoured Division*. General Duncan has been Representative Colonel Commandant of the *Royal Tank Regiment*, Governor of the *Royal Hospital Chelsea*, and Curator of the *Royal Armoured Corps Tank Museum*. He is the author of *AFV Profiles 5, 9, 12, 15*.

## **34 Scorpion**

## **35 Wheels, Tracks and Transporters British Armoured Recovery Vehicles**

## **36 French H35, H39 and S35**

## **37 Russian BT**

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# LOCO PROFILE

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**4 The American 4-4-0**

**5 The British Single-Driver**

**6 The Mallets**

**7 The Rocket**

**8 Royal Scots, LMSR Published Jan. 1971**

**9 Camels and Camelbacks**

The two had only one common point—the burning of anthracite fuel, but the camels burned good stuff and the camelbacks what was practically waste. The extraordinary shape of the camelbacks, or 'Mother Hubbards', arose from efforts to get a Wootten-firebox locomotive within the European loading gauge; but the type had no purpose in Europe, yet the shape begotten there was adopted in the U.S.A. though it meant separation of the driver and fireman. And the use of the low-grade anthracite culm meant hand-fired grates of 100 sq. ft.

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From the failure of *Fowler's Ghost* in the early 1860s to electrification in 1903-05 the enormous passenger traffic of the London Metropolitan and District Railways, including the Inner Circle, was operated almost entirely by a single class of condensing 4-4-0T.

*\*Note: The "Met" Tanks and Camels and Camelbacks will be published in reverse order.*

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The design was adopted also by three of the main-line railways, and spread in tender and tank form to Europe, Australia and South America.

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Up to 1858-60 the Norris factory was the largest manufacturer of locomotives in North America; and Wm. Norris was the first great American exporter of railway engines. In the 1840s his design influence in Europe was second only to that of Robt. Stephenson & Co. One English railway bought 17 of his locomotives and had another nine made in Lancashire. After successful 4-2-0 and 4-4-0 locomotives, Norris introduced in 1847 the first 4-6-0.

**12 BR Britannias**

After 150 years of steam locomotives the chance arose of concentrating all accumulated experience and knowledge in one group. Disappointing in view of the wealth available, the initial result—the Class 7 Pacifics of B.R.—were nevertheless among the more successful 'national' designs; but they had their troubles, and these, as well as the accomplishments and history, are told here in new style.

**13 Nord Pacifics**

**14 Pennsylvania Pacifics**

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**16 Union Pacific 4-12-2s**

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